GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

Office: Tribune Building, New York.

Conducted by . . . . . Professor C. S. Sargent.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, AUGUST 16, 1893.

TABLE OF CONTENTS.

PAGE.

Editorial Article:—Horticulture at the World's Fair. 341
An Observation on Fruit Decays. . . . . *Professor Byron D. Halsted.* 342
Notes on the Forest Flora of Japan.—XIX. (With figure.) . . . . . *C. S. S.* 342
Foreign Correspondence:—London Letter. . . . . *W. Watson.* 344
Cultural Department:—Small Fruits in Indiana. . . . . *J. Troop.* 346
Notes on Raspberries. . . . . *A. A. Crozier.* 347
The Water-garden. . . . . *J. N. Gerard.* 347
Liparis liliifolia. . . . . *Wm. F. Bassett.* 347
Vegetable Notes. . . . . *T. D. H.* 348
The Forest:—Suggestions from the White Pine Forests of Minnesota. *H. B. Ayres.* 348
The Columbian Exposition:—The Plant-effects in the Horticultural Building. (With figure.) . . . . . *Professor L. H. Bailey.* 349
Notes 350
Illustrations:—Alnus Japonica, Fig. 53. 345
Ground plan showing the arrangement of plants in the Horticultural Building at the Columbian Exposition, Fig. 54. 349

Horticulture at the World's Fair.

THE Horticultural Department of the Columbian Exposition has completed the first part in its history. The first-fruits of last year's crop are practically exhausted and the products of the current season are rapidly taking their places. The outdoor ornamentation has been largely of early shrubs and perennials, or plants, like Pansies, of last year's sowing, and now the plants of this season's growth are coming forward rapidly. It is an opportune time, therefore, to review, in a very general way, what has thus far been accomplished in the way of horticulture at Chicago. All criticism must be made in a spirit of sympathy, for, besides the insufficient time allowed for such a stupendous undertaking, an almost endless series of difficulties beset the managers. The horticulturists of the country, as a body, were slow to begin the work of collecting material and of interesting all the communities concerned. Very often the state legislatures failed to make appropriations until the funds were too late to be of service. There was not adequate time for arousing a strong public sentiment, and some states, which are capable of making excellent exhibitions, are practically unrepresented at the Fair because of lack of funds. Local, society and political jealousies have too often interfered with the expeditious securing of funds, and have perverted them to improper use when once appropriated. All this has given rise to the one most discouraging feature of the Fair—the fact that the displays have not been representative of the country as a whole. In fruits, a few states and provinces, notably California, New York, Oregon, Washington, Idaho, Missouri, Minnesota, Wisconsin, Illinois, Maine, and Ontario, have made creditable displays, but these states do not represent the pomology of North America; and as for foreign countries, only New South Wales and Italy have made any attempt to show fruits. The most lamentable failure in the pomological department was the almost entire absence of exhibits from the southern states in the early months of the Fair. A few states have done well, but the country as a whole has fallen far short of what was to have been expected of it.

All this is equally true of individual fruits. Visitors certainly had reason to expect a complete representation of those important fruits which have been developed within two generations from our native species. But not only have the raspberries, blackberries, native gooseberries, and even strawberries, been sporadic in their representation, but there has been no definite effort whatever to show our native plums. Some table should have been devoted, the season through, to showing these attractive fruits in all their variety, and from all parts of the country, but an occasional variety which now and then happens to come in, is the only thing to remind the visitor that plums grow wild in America. A vigorous and well-directed correspondence on the part of the Superintendent of Pomology could have shown these fruits and others in profusion and perfection. The visitor is now impressed with the feeling that certain states are capable of making great exhibits; but it would have been better if he had been impressed with the relative importance of the various fruits in our national economy, and with their peculiarities and variations. In other words, we believe that the proper basis for a comprehensive pomological display is fruit, and not states. Perhaps it would be difficult to interest the public without appealing to state pride, but it would have been easy to have secured sufficient overplus of special fruits to have made supplementary exhibits for the purpose of showing the whole progress and evolution and distribution of any one species.

The viticultural displays are among the most decorative in the Horticultural Department; but, unfortunately, there is little of genuine horticulture in them. They are made up almost wholly of wines and brandies, with a flavor of mineral waters, subjects which belong to manufacture and mining rather than to horticulture. Perhaps it would be well to divide grape interests into two parts, as is done by the Italians and others—viticulture, or grape-growing, and viniculture, or wine-making. There is certainly little more reason for including the manufacture of spirits under grape-culture than to group beer-making with hop-culture. All this, however, is a fault of the original classification, and it must be said that, in its way, the viticultural display is one of the best at the Exposition. Vegetables, save from Ontario and New York, have not been shown to any extent, and there is little promise of a representative display later on.

Among ornamental plants there are many very large and meritorious collections, and here, for the most part, state lines are dropped, and the exhibits are made by firms. An exception to this fact is observed in the Horticultural Building, where New York and Pennsylvania appear to contend for the questionable honor of having filled the great dome space with an unfortunate jumble of plants. There are many good individual plants and individual exhibits, but their arrangement is too often utterly bad. The mound under the dome, which is said to represent a mountain, has been the target of sarcasm from every competent and unprejudiced critic at the Fair, but the interior arrangement of the island and the disposition of the plants about the Horticultural Building are not less open to objection. The broad landscape features of the Exposition are incomparably good, but such details as fell to the Bureau of Floriculture are often wrought in the stiff and conventional forms which, unfortunately, are still called landscape-gardening by a great body of our people.

It is not our purpose to discourage any one who contemplates a visit to the Horticultural Department. He will be amazed and bewildered with the great variety and extent of the exhibits, and he will wonder how it could have been consummated within the given time. But the careful visitor must, after all, admit that this wealth of products is only such as one must expect from a country of great resources, and after he discovers that much of this bewildering variety is nothing more than poor arrangement, he will come away unsatisfied, if not humiliated. Much of

this can be corrected in the larger and fuller displays which are now coming on, but neither from the point of view of art nor of horticulture does the Exposition in every respect represent American resources. Foreign countries are well represented in a few lines in unperishable commodities, and in many ornamental plants, such as Rhododendrons, Azaleas and Roses, but in fruits and vegetables, in any form, pictorial or otherwise, they are conspicuously absent. It is, therefore, scarcely just to call this exposition a world's display of horticulture. This was the opportunity of the century to give to the American people a great object-lesson in horticulture which might have made itself felt from one end of the country to the other. The managers of the Exposition did not rise to the opportunity, and, while an attempt has been made to show our resources, the educational effect of the horticultural exhibits cannot be great or at all commensurate with their cost.

An Observation on Fruit Decays.

LAST season I made a study of Quince-rots, the results of which were published in Bulletin No 91 of the New Jersey Experiment Station. In the course of this bulletin it was stated that "a large Apple-tree stands in the orchard, surrounded on three sides by Quince-trees. The fruit, not the best, is permitted to drop and accumulate upon the ground in midsummer, it being an early autumn sort. These fallen apples were this season badly infested with the Sphæropsis, and the same was often the case with the fruit upon the tree. It was a noticeable fact that the Quince-trees that were close to this tree, some of them almost under it, were the most severely attacked. While there was no actual transfer of the infection by artificial means to demonstrate the fact, I am quite willing to hold the opinion that the Quince-fruit received the germs of the decay from the apples that were rotting by the bushel only a few feet away. That the decay should begin at the blossom-end is not unexpected, for there the spores, and the water causing them to germinate, would naturally lodge. The growing filaments of the spores would there find an easier entrance than elsewhere, because of the adhering floral parts. Near by, and with branches interlocking, stands a Pear-tree, and the fruit was quite badly infested with the Sphæropsis. Similar trees further away from the Apple-tree were less troubled with the decay, which only strengthens the opinion that all three kinds of fruit are naturally susceptible to the same infection, and the germs pass from one to the other through the air or by means of the various insects that visit the fruits, especially those with broken surfaces due to partial decay. The inoculations that were made in the laboratory seem confirmed by observations in the orchard. If the assumption holds, and it appears to be a sound one, it follows that the Apple-tree is a source of Sphæropsis infection for the quince and pear. The Apple bears comparatively worthless fruit, and the Quinces are the most valuable of all in this instance."

Yesterday (July 17th) a visit was again made to this orchard, and while no decay was manifested among the quinces and pears, a fact was obtained that confirms the view held at the close of the investigation last season. The Apple-tree is now loaded with fruit, and, for the most part, it is green and free from any rot; but upon one side is a good-sized limb, a graft of the Red Astrachan variety, also loaded with fruit, a large percentage of which is undergoing a decay. Over a hundred apples could have been gathered from the ground under this branch that were more or less decayed, many of them entirely rotten. Some of these fruits were brought to the laboratory and microscopically examined, the Sphæropsis being found on the specimens as was expected.

It will be seen that by this observation the enemy is traced back one step further. Last season the source of the quince and pear infection was tracked to a single tree, the fruit of which was an early autumn sort. Now, in the middle of July, the black-rot is confined to one branch of the tree bearing early summer fruit, where the decay is rampant, and, without question, is the particular place of exodus of the decay for the surrounding trees. The trouble is assisted by the shaded position held by the Astrachan limb, it being a low one, and overtopped by higher branches of the same and other trees. The fruit is poor, partly because of the shade and the decay, and it is left to accumulate upon the moist earth, where the fungus propagates extensively and develops myriads of spores. Therefore the conditions favor, naturally, the rapid multiplication of the enemy which later makes sad inroads upon the quince and pear fruit of the orchard.

In the bulletin it was recommended to lay the axe at the foot of the tree, but in the light of more recent observations it may be that the only action necessary is to remove the branch which bears the early summer fruit, for in this the decay begins its season's work, and from which it reaches out in all directions to cause destruction.

Rutgers College. *Byron D. Halsted.*

Notes on the Forest Flora of Japan.—XIX.

IN nut-bearing trees the forests of Japan are poor in comparison with those of eastern North America. The Hickory, if it ever existed in the ante-glacial forests of Asia, has entirely disappeared from them, and the Walnut family is now represented in Japan by three genera—Juglans, Pterocarya and Platycarya; the last two belong exclusively to the Old World. In Japan, Juglans is represented by Juglans Sieboldiana, a common forest-tree in Yezo and in the mountain-regions of the other islands. As a timber-tree it is much less important than either of the two eastern American Walnuts, as specimens more than fifty feet high are uncommon; it is a wide-branched tree, resembling our Butternut in habit and in the color of its pale furrowed bark, as it does in the pubescent covering of the young branches, the lower surface of the leaves and the fruit. The nuts are arranged in long racemes, and resemble those of the Asiatic, or, as it is familiarly called in commerce, the English Walnut (Juglans regia), rather than our American walnuts, which are deeply sculptured into narrow ridges, while the surface of the Japanese nut is smooth, or sometimes more or less pitted; it is pointed at the apex with thickened wing-like sutures, and is often an inch and a half long and about an inch broad, although it varies considerably both in size and shape; in flavor the kernel resembles that of the English walnut. The walnut is evidently an important article of food in Japan, as the nuts are exposed for sale in great quantities in the markets of all the northern towns. Juglans Sieboldiana is perfectly hardy here in New England, where it ripens its fruit; it is hardly worth growing, however, as an ornamental tree, as the Black Walnut surpasses it in size and beauty. It will produce fruit in regions of greater winter cold than the English Walnut can support, and as a fruit-tree it may find a place in northern orchards, although the abundance and cheapness of English walnuts seem to forbid its cultivation as a source of profit.

I am unable to throw any light upon the curious Juglans cordiformis of Maximowicz, distinguished by its flattened, long-pointed and more or less heart-shaped nuts. The tree which produces these peculiar nuts is not recognized by the Japanese botanists, who consider them an extreme variety of their common walnut. I looked in vain for nuts of this form in the markets of Hakodate, where they were first seen by the Russian naval officer Albrecht; afterward, however, I found them offered for sale by the Nurserymen's Association of Yokohama, and was told that they were collected on the sides of Fugi-san. A plant raised from one of these heart-shaped nuts has been growing for a number of years in the Arnold Arboretum, and last year it bore fruit. In habit and in foliage it is not distinguishable from plants of the same age of Juglans Sieboldiana. Juglans regia, although included in most works on the flora of Japan, does not seem to be a native of the empire; it is occasionally cultivated in the neighborhood of temples and as a fruit-tree, but we saw no evidence of its being anywhere indigenous, and it is probable that it was introduced from northern China, where one form of this tree apparently grows naturally.

Pterocarya, the curious genus with leaves like those of a Hickory, and long slender spikes of small hard nut-like fruits surrounded by foliaceous bracts, appears in Japan with one species; a second inhabits China, and a third, the type of the genus, the Caucasus. The Japanese Pterocarya rhoifolia is a large and important timber-tree. We first met with it in the lower margin of the Hemlock-forest about Lake Umoto, in the Nikko Mountains, where it grows to no great size; and it was not until we ascended Mount

Hakkoda, in the extreme northern part of Hondo, that we saw this fine tree to advantage. On the slopes of this mountain it is exceedingly common at elevations of from twenty-five hundred to four thousand feet above the sea, and, next to the Beech, is the largest deciduous tree of the region, often rising to a height of eighty feet, and producing trunks two and a half feet in diameter. It is a broad-topped tree, with stout branches which spread nearly at right angles to the stem, and form a dense leafy crown. In winter the Japanese Pterocarya may be readily recognized by its orange-colored branchlets, thickly beset with small light-colored lenticels, and by the stout acute buds, three-quarters of an inch long, covered with apiculate black puberulous scales conspicuously marked with clusters of pale hairs. The leaves are unequally pinnate, eight or ten inches long and four to six inches broad, with stout hairy petioles, and six or seven pairs of lateral leaflets, which are acute, unequally rounded at the base, long-pointed, finely serrate, yellowish green, and covered on the lower surface of the midribs with pale or rusty brown pubescence. In the first days of October, when the fruit was fully ripe and just ready to drop, the leaves were beginning to turn yellow; a month later, in the forest above Lake Umoto, the trees were bare of foliage. A specimen of the wood of Pterocarya rhoifolia, for which I am indebted to the officers of the Forestry Department at Aomori, is white, soft, very light and straight-grained, with bands of open ducts marking the layers of annual growth; it might be mistaken at the first glance for a piece of our American white pine.

The other Japanese member of the Walnut family, Platycarya strobilacea, we only saw in the Tôkyô Botanic Garden, where there is a tree fifteen or twenty feet high, which last year was covered with the curious cone-like heads of fruit which distinguish this genus. In the mountain-regions of Kyushu it is said to become a large and stately tree. Platycarya is occasionally cultivated in the botanic gardens of southern Europe, but I am not aware of its growing in any part of the United States.

Myrica Gale, in a distinct pubescent form, is as common in low marshy ground in Yezo as it is in the same latitude in North America, and a second species of Myrica, akin to our Bayberry, inhabits the sandy coast, although it does not range far north of the thirty-fifth parallel. This is the handsome evergreen Myrica rubra, a small shapely tree, now well known in California gardens and occasionally cultivated in the southern Atlantic states.

In Japan, as in all other temperate northern lands, the Cupuliferæ abound, and the deciduous forests of the northern islands are principally composed of Oaks, Beeches, Hornbeams, Alders and Birches. The mountain-forests of Hondo and those of Yezo contain many Birch-trees, which are also important elements of the forest in all northern and north-eastern Asia. The Old World White Birch, Betula alba, in at least three of its forms, is common in central Yezo, and we saw also a number of trees of the typical form on the plains between Chuzenji and Umoto, in the Nikko Mountains. The most distinct of the Japanese forms of Betula alba is that which botanists call var. Tauschii, and which is distributed from southern Siberia through the Amour country to Yezo, where it is a slender tree, sometimes eighty feet in height; it is distinguished by its larger and rather thicker leaves, which are of a deeper and more lustrous green on the upper surface than those of the other forms of the White Birch with which it is associated. It is certainly worth a place in our plantations. The variety verrucosa, well distinguished by the warts which beset the young branches, appears to be confined in Japan to Yezo, where, so far as we were able to observe, it is an exceedingly rare plant.

In the forests of Yezo, too, we saw, for the first time, Betula Maximowicziana. This is certainly one of the handsomest trees in Japan, and one of the most distinct and beautiful of the Birches; and its introduction into our plantations was alone well worth the journey to Japan. In Yezo, Betula Maximowicziana is a shapely tree, eighty or ninety feet in height, with a trunk two or three feet in diameter, covered with pale smooth orange-colored bark. Toward the base of old individuals the bark becomes thick and is ashy gray, separating into long narrow scales. The branchlets are stout, covered with dark red-brown bark and marked by many pale lenticels. The leaves, however, are the most distinct feature of this tree; in size they are not equaled by those of any other Birch-tree, and as they flutter on their long slender stalks they offer a spectacle which can be compared with that which is afforded by our silver-leaved Linden waving its branches before some Hemlock-covered hill of the southern Alleghany Mountains. The leaves of Betula Maximowicziana are broadly ovate, cordate at the base, coarsely and doubly serrate, very thin and membranaceous, dark green and lustrous on the upper surface, pale yellow-green on the lower, four to six inches long and four or four and a half inches broad. The flowers and fruit I have not seen. The male catkins in September are an inch and a half long, very slender, with bracts rounded and apiculate at the apex. From the seeds, for which I am indebted to the Forestry officials of Hokkaido, a large number of seedlings of this fine tree have been raised in the Arboretum. Specimens collected in the Nikko Mountains by Meyer indicate that it is an inhabitant of Hondo, where, however, we did not see it. From Yezo it ranges northward through Saghalin into Manchuria. The tough thin bark is used by the Ainos for many domestic purposes.

The most common Birch of the high mountain-forests of Hondo is Betula Ermani, a handsome species now well known in European and American collections, into which it has been introduced through the agency of the St. Petersburg Botanic Garden. In Hondo, where it is found scattered through the coniferous forests, it is common at elevations of from four to six thousand feet above the sea, and is conspicuous from the white bark of the trunk and the bright orange-colored bark of the principal branches. From the different forms of the White Birch this species can be readily distinguished in the herbarium by the long spathulate middle lobe of the bract of the female flower; in the forests the color of the bark of the branches well distinguishes it.

On the shores of Lake Umoto we found a single individual of a black-barked Birch-tree, much like our American Betula lenta, with the same cherry-like flavor in the bark of the branchlets. From Betula lenta it differed in its larger, more obtuse and paler winter buds, in the more prominent midribs and veins of the leaves covered on their lower surface with silky pubescence, and in the shorter cones of fruit, the lateral lobes of the bracts being narrow and acute, instead of broad and rounded, as in the American species. With considerable hesitation I have referred this tree to the Betula serra of Siebold & Zuccarini. The seedling plants which have been raised in the Arboretum will, perhaps, throw some light upon its true position. Betula ulmifolia, B. Bhojpattra and B. corylifolia, included in the flora of Japan, we did not see.

In Japan Alders are more numerous in species, and grow to a much larger size than in eastern America. Alnus incana, which is only a shrub here, in Japan becomes in some of its forms a stately tree fifty or sixty feet in height, forming trunks often two feet in diameter. Trees of this size of the varieties glauca and hirsuta, the latter well characterized by the pale pubescence which covers the lower surface of the leaves, are common in Yezo, where they are found on low slopes in moist rich ground, but not often close to the banks of streams, which are usually occupied by Alnus Japonica. This is the largest and most beautiful of the Japanese Alders. It is a pyramidal tree, often sixty to eighty feet tall, well furnished to the ground with branches clothed with large dark green lustrous leaves. This species has been confounded with the rare North American Alnus maritima (see figure 47, on p. 269 of vol. iv. of this journal), from which it differs in habit and in the size and color of the leaves. The fruit of the two spe-

cies is very similar, but the Japanese tree flowers in the spring, ripening its fruit in the autumn of the same year, while the American tree flowers in the autumn and does not perfect its fruit until a year later. The figure of Alnus Japonica which appears on page 345 of this issue has been made from a drawing of a wild specimen gathered in Yezo, and appears to be the first which has been published.

Alnus Japonica is sometimes found in our collections, and is generally cultivated under the name of Alnus firma. It is perfectly hardy in New England, where it grows rapidly, and promises to become a large and handsome tree. The true Alnus firma, which is largely planted along the margins of the Rice-fields near Tōkyō to afford support for the poles on which the freshly cut rice is hung to dry, was not seen growing under what appeared natural conditions; but the beautiful mountain-tree, distinguished by the thick conspicuously veined leaves, which has been considered a variety of Alnus firma (var. multinervis), we often saw on the mountains of Hondo, where it grows on dry rocky soil and reaches elevations of some five thousand feet above the sea-level. It is a graceful tree, sometimes twenty or thirty feet high, with slender spreading branches and thin flexible branchlets covered with ample, thick, dark green, acute leaves with from sixteen to twenty-four pairs of pale conspicuous straight veins. When better known, this handsome tree will probably prove to be specifically distinct, and a garden-plant of value.

What has been considered a form of Alnus viridis (var. Sibirica) is a very distinct-looking plant in Japan, with broadly ovate cordate leaves fully twice as large as those produced by Alnus viridis in America or Europe. At high elevations on Mount Hakkoda we found it growing as a bushy tree from twenty to twenty-five feet tall, and forming a short stout trunk. A review of all the known forms of Alnus viridis will probably necessitate the separation of the Japanese plant from it. *C. S. S.*

Foreign Correspondence.

London Letter.

Dipladenia eximea.—This is a new species lately introduced by Messrs. Sander & Co., of St. Albans, who sent flowers of it to Kew for determination. It is, I believe, Brazilian, and, according to Mr. Hemsley, who describes it in the *Gardners' Chronicle*, it is nearest to D. acuminata of the *Botanical Magazine*, t. 4828. I saw the flowers and can vouch for their exceeding beauty and distinctiveness from every other species or variety of Dipladenia known in gardens. It is, of course, a climber, with broad, oval dark green leaves less than two inches long, and clusters of flowers, each between two and three inches in diameter and colored deep rich rose, funnel-shaped, with short broad-spreading, elegantly curved lobes, narrowed to an acute point. The plants in Mr. Sander's nursery grow very freely, and altogether I should be disposed to pronounce this one of the very best of all known Dipladenias. The color of the flowers is exquisite.

Dipladenia Harrisii.—This is a very handsome stove-climber, a large specimen of it in the Water-lily house at Kew bearing several long shoots clothed with racemes of large yellow Allamanda-like flowers, tinged with red at the base of the lobes. It was discovered in Trinidad by Mr. Purdie, who described it as "a fine plant, not surpassed by any one of its congeners, whether we consider the size and beauty and fragrance of its flowers of metallic lustre, or its entire habit." It was named in honor of Lord Harris, at that time Governor of Trinidad, and was first flowered by Messrs. Veitch in 1854. The leaves are large, some being fully a foot long by four inches broad, and the plant is a sturdy, quick grower, much more amenable to ordinary treatment than the Dipladenias of the amabilis type. In the *Genera Plantarum*, D. Harrisii is referred to the genus Odontadenia. It is a first-rate garden-plant.

Bignonia purpurea.—This is one of the most beautiful of all stove-climbers, but it requires to be understood to be a success. In the Palm-house at Kew it is trained against the curvilinear roof, from which, at the present time, its numerous shoots hang in great profusion, some of them two yards long and clothed with large clusters of richest purple-blue flowers, as large as those of B. speciosa, and even more attractive. The leaves are bifoliate, bright green, and the flowers are borne in the axils, as many as a dozen flowers, in some cases, clustering about each pair of leaves. Until we ceased to prune this plant in winter it flowered only sparingly, but now that we leave all the summer-grown shoots we get the effect above described. Whatever pruning is necessary is done as soon as the flowers are over. This species is not new, but it is so rarely seen or heard of in cultivation that I venture to recommend it strongly as a first-rate summer-flowering stove-climber.

Cattleya Rex.—In my last letter I described a three-flowered scape of this distinct and beautiful Cattleya which was exhibited at Chiswick. This week I have seen two more scapes, equally fine, from the collection of Mr. T. Statler, at Manchester, and now I learn that Messrs. Sander & Co. have "an importation, guaranteed true, of this Cattleya, in superb order and condition. Some of the plants are great masses, with old flower-spikes equal in size to C. gigas Sanderiana, and showing nine and ten flower-scars on each spike." These plants are to be sold by auction in Messrs. Protherse & Morris' rooms in Cheapside, on Friday, August 4th. At the same time this firm will offer more plants of Eulophiella Elizabethæ and three new Cypripediums named Sargentii, Nicholsonianum and Massaianum. Orchid fanciers are being exceptionally well favored by the importations of new kinds this year.

Lælia monophylla.—We have no more charming little summer-flowering Orchid than this. At the present time there are about a dozen examples of it in flower in the cool Orchid-house at Kew, each bearing from six to a dozen flowers of elegant butterfly form, and colored vivid orange-scarlet. I have heard of a plant which bore three flowers on a scape, but all of the plants at Kew have only a single flower on each scape. The pseudo-bulbs are no thicker than a knitting-needle, six inches long, each bearing a single narrow leaf three inches long. The scape is slender, curved, three inches long, and the flower is between one and two inches in diameter. The Kew examples have been in flower a fortnight, and the flowers are still quite fresh. They are grown in a cool house along with Masdevallias, and they get a fair supply of water all the year round. This species was first introduced and flowered at Kew in 1882, plants having been found by Mr. Morris in Jamaica on St. Andrew's Mountain at an elevation of about 5,000 feet. Mr. Norman Cookson is trying to cross it with other species of Lælia.

Eucryphia pinnatifolia.—A healthy plant five feet high, planted as a specimen on a lawn at Kew, has lately flowered freely, no doubt owing to the hot weather experienced here. It has also flowered exceptionally well this year in Messrs. Veitchs' nursery at Coombe Wood, a photograph taken recently showing a plant ten feet high covered with large white single Rose-like flowers. It appears to be perfectly hardy in England, and is certain to become a general favorite. It was introduced into cultivation by Messrs. Veitch & Sons about fifteen years ago. According to Sir Joseph Hooker, it is a very local plant, being confined, so far as is known, to the Cordillera of Concepcion, in Chili, where it forms a bushy tree ten feet high, and is called "Nirrhe." Two years ago a second species, E. Billardieri, a native of Tasmania, was flowered at Kew, and when describing it in the *Botanical Magazine* under t. 7200, Sir Joseph Hooker, remarking upon the position of the genus, says: "The fact is that Eucryphia has no hitherto recognized, undoubted near relatives in the vegetable kingdom, and having regard to the two most noticeable points in its history and structure—namely, that it is confined to Chili and Australia, and that of the three known species two

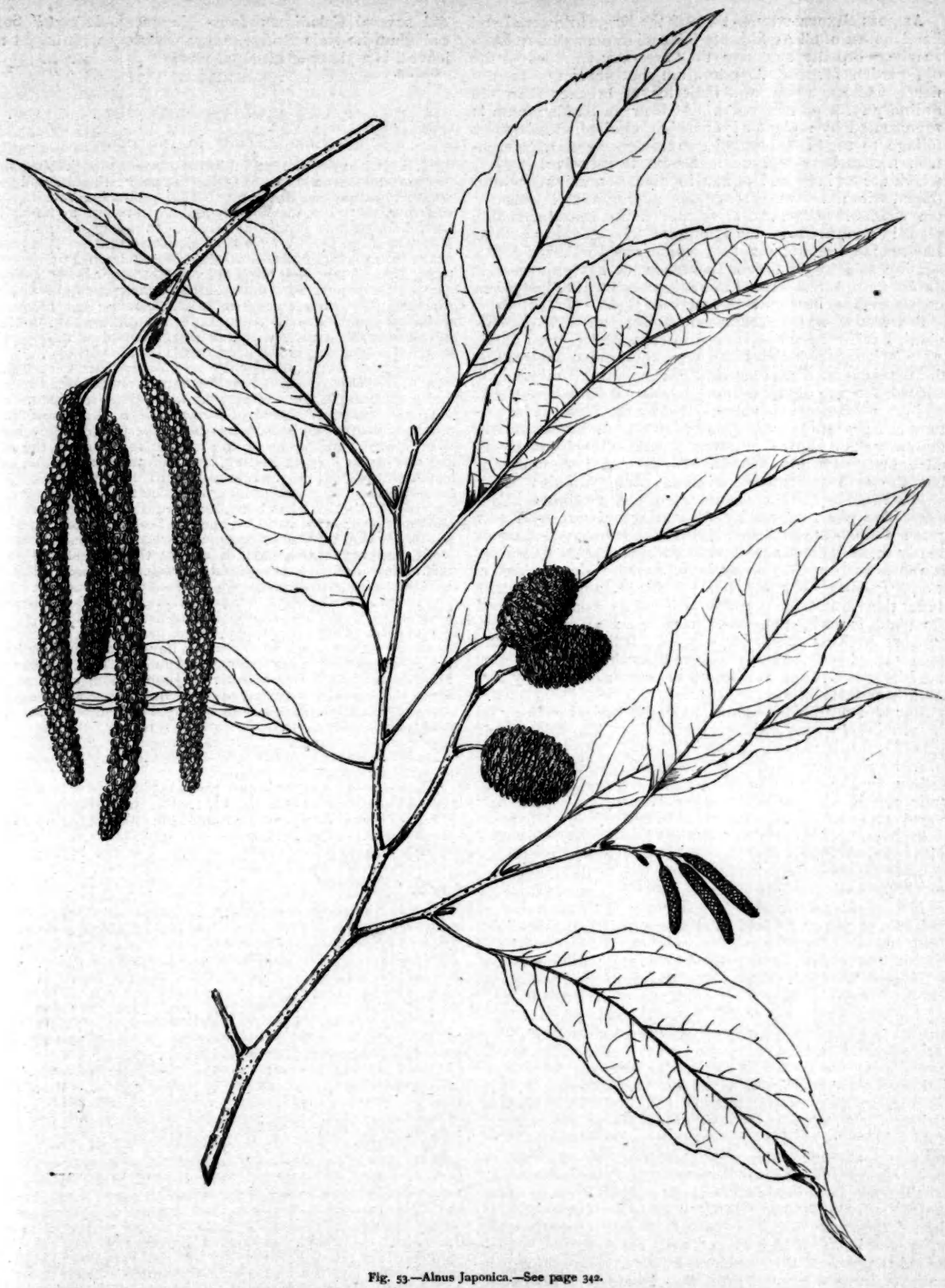

Fig. 53.—Alnus Japonica.—See page 342.

have simple and one pinnate leaves—it may well be regarded as the evidence of a vegetation different from that now existing, which flourished when there was either direct or interrupted land communication between the temperate regions of Australia and South America." The third species, E. Moorei, is a native of New South Wales.

Aerides Sanderianum.—Two of the largest-flowered and handsomest of all Aerides are this and its near ally, A. Lawrenciæ. Broadly speaking, they are only varieties of the old garden favorite, A. odoratum, but their flowers are nearly as large again, and their leaves broader than the ordinary form of that plant. At Kew, A. Sanderianum is represented by a plant a yard high, clothed with healthy foliage to the base, bearing two flower-scapes, each eighteen inches long and clothed with twenty-five flowers, which are an inch and a half in diameter, creamy white, tipped with amethyst, and deliciously fragrant. It is nearly ten years since Messrs. F. Sander & Co. introduced this plant in quantity from the Philippine Islands along with A. Lawrenciæ, the first plant of which was purchased at an auction sale by Sir Trevor Lawrence for 235 guineas. It differs from A. Sanderiana in having pure white, instead of creamy white, flowers with amethyst tips.

Platycodon grandiflorum.—Although an old garden-plant, having been introduced in 1782, and figured in the *Botanical Magazine* under the name of Campanula grandiflora, this is still a somewhat rare plant in cultivation. Indeed, the pan of it exhibited by Mr. G. Paul this week, and awarded a first-class certificate by the Royal Horticultural Society, attracted more attention from horticulturists than any plant shown, and was looked upon by many as an entirely new introduction. Platycodon is monotypic, but shows considerable variation, some varieties being only six inches high, while others grow to a height of three feet. The plant shown by Mr. Paul was dwarf, with soft green Willow-like leaves and terminal bell-shaped flowers nearly three inches across, colored rich deep purple-blue. It appeared to be the variety introduced by Messrs. Veitch & Sons from Japan about ten years ago, and distributed under the varietal name of Mariesii. The worst feature of the plant is its questionable hardiness; at any rate, it perishes at Kew in severe winters. It likes a deep, rich, well-drained soil; in very cold weather the protection of a hand-light is advisable. Grown in pans, as shown by Mr. Paul, it makes a pretty specimen.

New and certificated plants shown at the last meeting of the Royal Horticultural Society included the following: Miltonia vexillaria, var. Daisy Haywood, with large, well-formed pure white flowers, save a small irregular blotch of yellow on the disc. Lælia crispea superba, a first-rate variety with pure white flowers, a deep plum-purple lip, edged with white and very crisp. Cypripedium Edwardii (Fairrieanum × superbiens), a distinct and attractive hybrid, with elegant curved petals, white and green, profusely spotted, the dorsal sepal white with purple lines, and the pouch greenish white tinged with lilac. It was exhibited by Messrs. Pitcher & Manda. Cattleya Hardyana, Tates' variety, the richest colored of all the forms of this brilliant Cattleya.

Strobilanthes Dyerianus was shown in superb condition by Messrs. Sander & Co. and was universally admired. A tuberous Begonia, named Mrs. Bourne, remarkable in having the outer segments of the flowers large, leaf-like and colored bright yellow and green, obtained an award. The variegated Hop (Humulus Japonicus variegatus), with leaves freely marbled with white, was pleasing and should find favor as a quick-growing climber for covering verandas, etc. Cupressus macrocarpa, var. lutea, from Messrs. Dickson & Co., attracted considerable notice, on account of its yellowish color, combined with erect pyramidal habit and an appearance quite unlike the type. Mr. A. Waterer again showed his beautiful variety of Spiræa Bumalda, which was awarded a first-class certificate. Lantana Drap d'Or, from Messrs. J. Veitch & Sons, is a likely-looking plant for summer bedding, its height not exceeding six inches and its form a compact ball, covered with short-stalked bunches of bright yellow flowers. Didymocarpus lacunosa, from the same firm, was awarded a botanical certificate. It is like a Streptocarpus, the color of the flowers being almost gentian blue. Several of Mr. Eckford's new varieties of Sweet Pea obtained certificates, as also did several Caladiums from Messrs. J. Laing & Sons. Caladium Le Nain Rouge, a dwarf variety with bright red leaves, is a pleasing little pot-plant.

London. *W. Watson.*

Cultural Department.

Small Fruits in Indiana.

THE fruit crop of 1892 in Indiana was remarkably short, principally on account of the excessive rainfall and cold weather during the flowering period. Our small-fruit growers were, therefore, confidently looking forward to an abundant harvest this year, but have been again disappointed. Records of the State Weather Service show that the daily mean temperature for the month of May ranged from 43.5 degrees to 74 degrees, reaching the latter point only once, and gaining a mean temperature for the month of only 57.5 degrees This retarded plant-growth very materially, causing the blossoms to appear much later than usual. While the amount of rainfall during the month was less than normal it was so distributed during the blossoming period that, when combined with the low temperature, bees and other insects were prevented from flying, the pollen was kept almost constantly wet, and consequently the flowers were improperly fertilized.

This was especially true of Strawberries. Old growers report that this season's crop has been the poorest they have ever known. In addition to the lack of fertilization, the dry, hot weather in June caused the fruit to ripen very quickly and much of it prematurely. It is a difficult matter, therefore, to compare varieties without doing injustice to some. For example, Warfield's No. 2 has been, for a number of years, one of our most productive varieties and the best berry for canning, but this season it failed to come up to the average. Bubach's No. 5, under good treatment, is one of the largest and most profitable varieties, although only a moderate bearer. Haverland is another which combines productiveness and size when well cared for. It always brings good prices, but is better for a home market on account of its lack of firmness. Edgar Queen is a comparatively new variety, but it promises to give better satisfaction than many others which have been highly advertised. Eureka is a late variety, and for that reason was caught this season by the dry weather in June, which cut it short. Greenville is an Ohio variety and one that has given us good crops of fine fruit. Park Beauty is one of the earliest and most productive varieties we have tested. It is about the size of the Crescent and resembles it in many respects. Shuster's Gem is another excellent variety, both in vigor of plant, productiveness and size and quality of fruit.

These are all pistillate kinds, and, of course, must be accompanied by perfect blossoming sorts. It is more difficult to find a real good staminate variety, but occasionally we find one which has real merit. Brunette is one of these, a native of Indiana, a good grower, productive, and of the first quality. For home consumption, to be used while fresh, I prefer this berry to any other with which I am acquainted. Jessie is a good berry when all the conditions are favorable, but it is too unreliable to be recommended for general cultivation. Katie, Louden's No. 15, and Louise are all good staminate varieties. Lovett's Early has proved to be a valuable variety, although not early enough to warrant the latter half of the name. Parker Earle is a very good late variety, although not superior to many others. The old Wilson's Albany seems to have run its course, except in a few localities. J. M. Smith, of Green Bay, Wisconsin, has been very successful with it, but plants from his grounds set out here two years ago have proved a complete failure so far as fruit is concerned.

The Raspberry crop throughout the state is below the average, owing to a deficiency of rainfall for the month of June and first ten days in July. The normal rainfall for June at this place is 4.80 inches; that for the past month was only 1.93. This has caused the fruit to dry up badly. Besides this, the anthracnose has seriously affected the canes in many localities, and has so reduced the crop. Many growers have not yet learned to use the Bordeaux mixture against fungal diseases. Judging from their behavior this season, Progress and Johnston's Sweet would be stricken from the list of Black Caps as being too small. Conrath's Early is a new variety, and has done remarkably well. Nemaha continues to be our best late variety. It is a hardy Gregg. Of the red varieties Cuthbert, Mohler's No. 1, Muskingum and Thompson's Early are the only ones worthy of mention this season. Child's Japanese Wineberry proves to be the tenderest thing in the shape of a Raspberry that we have here. It never bears any fruit unless well protected during the winter.

The cultivation of the Blackberry is comparatively new in this state because in many localities wild berries could be had for the picking. In many parts of the state, however, commercial Blackberry-growing is coming to be an extensive business. Agawam, Ancient Briton, Early Harvest, Eldorado, Erie, Gainor, Minnewaski, Snyder, Stone's Hardy, Taylor and Wallace are all grown, and the Lucretia Dewberry is also grown to some extent. Early Harvest is too tender, except for the southern portion of the state.

The cultivation of Currants and Gooseberries has been practically abandoned in many sections on account of the ravages of the currant-worm or gooseberry-sawfly. Indeed, it is not yet generally known that so simple a remedy as hellebore dusted on the bushes at just the right time will prevent all this trouble. According to this year's observations, the Fay currant is of good size, but not prolific enough to make it profitable. Moore's Ruby is decidedly the best red currant we have. Wilder is equal to it in size, but not in productiveness. These two, with the old Red Dutch, make a good trio. The Crandall is the best black variety, but it varies so much that it is not always reliable, and many persons do not like the peculiar flavor. In fact, I do not know why we want a black currant. Early Orange Gooseberry is the best and most prolific early variety. Champion is about the size of Downing, and more productive. Houghton is very productive but small.

Experiment Station, Lafayette, Ind. *J. Troop.*

Notes on Raspberries.

THE season, though late, has been a favorable one for fruits and vegetables of all kinds. The berry season is now (July 22d) upon us, and the present hot weather following an early summer, with plenty of rain, is bringing on one variety after another with unusual rapidity. Nothing is more apt to be misleading than one season's experience with any variety. Kinds which are ten days apart one year may ripen almost together the next. A good year like this serves also to bring out the merits of the less popular sorts. Marlboro and Rancocas have done superbly this season; even Highland Hardy, though discarded from our state catalogue, gave a fine yield of early berries.

The new Black Cap, Conrath's Early, has given another good crop. It originated here, and while not as early as it at first appeared, being later than either Palmer or Souhegan, it yields good crops of larger berries than those of either of these two varieties. This season its heaviest crop came with the first picking of Gregg.

Ann Arbor, Mich. *A. A. Crozier.*

The Water-garden.

WILLIAM TRICKER sent me, last week, a specimen of the interesting Swedish Water-lily, whose flowering I do not remember to have seen recorded since Mr. Hovey, of Boston, grew it successfully some years ago. Of late years it seems not to have been in cultivation here, and it is the rarest Nymphæa in American collections. The Swedish Lily, known variously as N. alba, var. rosea, N. alba, var. rubra, N. Caspary and N. sphærocarpa, was discovered in 1856 in a remote lake in Sweden, Lake Fayer (Fayer tarn). It was named N. sphærocarpa by Professor Caspary, and was originally introduced to cultivation by Froebl, of Zurich, in 1877 or 1878. In the latter year it was offered by an English florist at £5 a root. For some reason, while the rhizomes of this plant seem strong and produce a fair number of buds, it does not appear to be a vigorous grower under ordinary conditions. My plant, which I have had two years, has never given me a flower, and at present is quietly asleep at the bottom of the tank, with no floating leaves. It started off promptly early in the season, but soon dropped its floating leaves and went to rest. At Dongan Hills there has been a more successful result, and the flower sent me shows that this is a most distinct and beautiful variety. While it may be botanically allied to N. alba, or a variety of it, the petals are much narrower and rounded or blunt at the tips. The color, on first opening, is pale pink, later changing to a rose-pink quite blue in tone. This color is not a suffusion, but appears as linings on a white ground. In a good light the flower is effective and charming, though, like all other flowers of this color, rather ugly in a dull light. The stamens deepen to a dark rich orange. If my description is clear, it will be noticed that we have here one of the parents of N. Laydekeri, which has the same coloring and the same peculiarity of deepening in color from day to day. Otherwise the characters of this hybrid are all those of N. pygmæa, except that the size is intermediate between the two. The petals are broad and pointed, and the root habit is that of Nymphæa pygmæa, which does not allow of division, and is usually grown from seed. The roots of N. Laydekeri have allowed of no division with me, and I am at a loss to know how it is propagated except from seed, from which it apparently comes true. The price has rapidly declined, which seems to indicate that it increases rapidly, as do most Nymphæas. In fact, there are so many species and varieties of these plants, mostly requiring ample space to develop their full beauties, that one has never sufficient surface-room in the water-garden for many of them. The end of varieties is not yet, for they hybridize freely, and one is apt to find his tank or pond full of young seedlings with unknown possibilities. Many of these are lost, of course, where ponds are crowded with well-developed leaves of established plants, but it only requires slight care to transfer them to permanent quarters where they may have light and room to develop. Now that so many kinds are grown we may expect often to find new natural hybrids. N. Zanzibarensis seems to increase in ruder conditions than was thought possible. Two of my friends had young plants this season from seeds which were exposed in their tanks all winter. It is not astonishing that seeds of tender plants should survive this ordeal, but it has been the practice to germinate this tropical variety at a high temperature, and it is noteworthy that such practice is apparently not essential. However, seedlings of such varieties thus germinated would probably not make sufficient growth the first season to become useful plants. They may, however, be grown on and starved for the production of tubers, which can be wintered more easily and safely than flowering plants, and which the succeeding season give several strong growths from each tuber. It is a peculiarity of Nymphæas that starvation tends to increase of stock. A starved rhizome will produce usually many more buds than a strong-growing plant. A starved or checked tuberous Nymphæa seems to devote its efforts to the production of tubers. The production of tubers is not only advantageous for the safe storage of stock, but it offers the only feasible way to propagate species whose seedlings, like N. Zanzibarensis, are very variable in color. Seedlings of this species will often run in shading from light reddish purple to dark blue-purple, and are most esteemed the nearer they approach an intense rich color. Given a satisfactory variety, it will be seen that to cause it to form tubers from which numerous breaks will give young plants, is a certain means to propagate true stock. N. rubra and N. Devoniensis are also propagated in the same way, but these form tubers more quickly and naturally than N. Zanzibarensis. N. flava and N. Mexicana form cone-like tubers, and throw out many runners, on which are formed clusters of thong-like tubers, which quickly form new plants. There is not much vigor in the old tubers of these Nymphæas, though I have had them exist in an out-of-door tank through the winter. The young tubers retain their vitality perfectly, though I should prefer to store them in warmer quarters.

The care of water-plants at this season consists in keeping them free from aphides, removing decaying growths and keeping in check the more vigorous and rapidly increasing plants. Bare water-spaces are more attractive in a water-garden than such masses or breadths as many of the minor plants rapidly make if allowed to grow unchecked. Among plants to be avoided, except in special positions, and never to be used with Nymphæas, I should include the dainty floating plants, Azolla Carolinensis, Salvinia nutans and Trianea Bogotensis. These, while individually pretty and interesting by their masses, make a pond untidy and shade the Lily-roots. Limnanthemum nymphæoides is a hardy plant, which becomes a troublesome weed, difficult to exterminate. The cucumber-like yellow flowers are not attractive enough to recommend it. Eichhornia cœrulea has much handsomer flowers than the better-known E. crassipes major, but it grows rapidly and vigorously and will smother any plant which it overtakes in its straightaway course. E. crassipes major, while growing as vigorously, is more readily kept in check. One has to reduce its masses almost daily, but it is a plant to be grown for its curious habit and abundant flowers.

With few exceptions, the most satisfying minor aquatic plants are those which are not of wandering habit and do not occupy much water-surface, which is always valuable. A water-garden, to be most effective, requires ample vacant water-spaces to serve as a setting to the plants which may or may not be acquisitions, but certainly will not appear so if crowded together.

Elizabeth, N. J. *L. N. Gerard.*

Liparis liliifolia.—While not characterized by brilliancy of coloring or striking peculiarity of form, L. liliifolia is by no means destitute of quiet beauty, and, in common with other

Orchids, its odd-shaped flowers are interesting, and the whole plant is attractive in appearance. From solid bulbs of half to three-quarters of an inch in diameter it sends up two rather large ovate leaves and a loose spike of twenty to forty or more flowers, growing six to eight inches high. The flowers have three linear sepals, one of which points backward, looking very much like a spur, the other two, diverging a little, are placed close under and project in the form of a short point beyond the lip, which is wedge-obovate and abruptly short-pointed and half an inch long. Two thread-like petals, about half an inch long, are turned downward, curving toward each other at the lower end. The calyx is greenish white, the lip and petals brown-purple, and the pedicels dark purple. Two years ago I collected several plants while they were in flower, and last year several more. They were planted in a flat as a convenient method of experimenting with their culture. They have stood in the shade of a building, where they only get about an hour of sunshine in the middle of the day, and entirely unprotected, except that they were covered by snow for a few weeks during last winter. They were planted very shallow, so that a portion of the bulb is exposed above the surface, and they have not been injured in the least by the severe weather. In its wild state the Living-blade, which is the common name of this plant, grows in moist woodlands, but my experience seems to show that it will thrive under ordinary care if partial shade is given to it.

Hammonton, N. J. *Wm. F. Bassett.*

Vegetable Notes.—Our last sowing of American Wonder Peas and Valentine Beans is made by the 10th of August. We shall make another sowing of Lettuce, using Deacon and black-seeded Ferris Ball. Radishes we continue well into September, sowing the small hardy red turnip variety. Prickly Spinach, for fall use, is in by the 7th of August, and about the first of September we shall make another sowing for wintering over. This is sown on ridges so as to shed water, and is covered with light litter to protect it from frost. Lettuce may be put into frames about the first of September and headed up with the use of sashes. With protection it can be kept well along into December. A few roots of Parsley for winter picking should be placed in a corner of a frame, the smallest roots being planted, as these are most easily established. A few roots of Watercress are also desirable. It is surprising how well this plant does in an ordinary frame.

Wellesley, Mass. *T. D. H.*

The Forest.

Suggestions from the White Pine Forests of Minnesota.

WHILE moving through the woods during a number of years I have made some study of the great variety of circumstances under which the White Pine grows, in the hope of discovering some of its preferences as shown by examples of its best development under some more or less definite chain of circumstances. Since some of the notes were taken I have found that probably all the principles involved are known, but as they are not known to every one it may be of use to present and repeat them. Another object in offering the notes is that others may find in them some suggestion in determining how to plant and care for an artificial forest, or to aid them in the more difficult task of taking any given piece of woodland and making the best of it. In making a selection of these notes I have used those only that may distinctly indicate the circumstances under which White Pine timber develops the best. In general the history of every forest is a record of disaster and recovery. A new growth comes in after cutting and fire, and the old trees are replaced by the young.

(1) In a dense growth all of one species, especially if the soil be poor or subject to drought, or to floods, much of the timber is found defective, especially with ring rot, owing probably to imperfect nourishment of the tree, which is thus unable to mature the annual growth of wood during unfavorable seasons.

(2) If the growth is not dense enough to subdue the lateral branches, the trunks grow short and knotty, with a large proportion of sapwood; while Pine, started under Poplar and Birch and kept closely surrounded by growing trees, has a rapid upward growth free from branches, and forms tall, straight, clear trunks, with little sapwood.

(3) If a large trunk is to be grown in a short time, it should be remembered that a tree started among an accompanying growth that will never reach a great height or will soon be overtopped by the Pines, but will yet remain densely shading the trunk to a height of twenty feet, will probably produce a log sixteen feet long and two feet in diameter at the small end in sixty years.

(4) The fact that many of the large trees, otherwise sound and vigorous, are hollow near the butt or throughout the butt log, indicates that the sapling from three to eight inches in diameter, which was barely able to exist under the overtopping forest, may upon receiving sufficient light and nourishment become vigorous; and although the defective wood, formed when the tree was unable to mature its wood, cannot be replaced, it may be covered by sound wood, and the small hollow left by the decay of this imperfect wood will not seriously affect the value of the tree for lumber.

(5) The best Pine timber is found scattered among hardwood on fertile, porous, well-watered and well-drained loam, without much humus, and is from 100 to 200 years old and about 125 feet high. The accompanying "hardwood" is usually younger, and in Minnesota usually consists of Basswood, Maple, Red Oak and Yellow Birch.

(6) A good growth of sapling White Pine, some ten to twenty inches in diameter, is frequently found overtopping and killing White Birch, Poplar and Balsam Fir, which are then replaced to some extent by Maple, Basswood, Oak and Yellow Birch.

(7) A dense growth of White Birch or Poplar, ten to thirteen feet high, is frequently found overtopping young White Pine.

(8) On nearly every tract where mature White Pine-trees are growing, White Pine-seedlings also are found, and often these are numerous enough to retimber the tract thoroughly.

(9) The mere cutting of the mature timber does not destroy many of these little seedlings, but many are killed either by too much exposure to the sun or by too much shading.

(10) The greatest danger to the seedlings is from the fire that usually follows the cutting, burning every shrub and small tree, and frequently killing even the large trees, both conifers and hardwoods that may have been left from the cutting.

(11) Sometimes a fire has destroyed all except a few large scattered Pine. In such a case the first growth to spring up is Poplar, White Birch, Willow and Balsam. Under the shelter of these saplings young Pines start, to eventually overtop the less vigorous trees that have nursed them, and thus the tract will be retimbered with the same species that covered it before.

(12) A growth of timber can be secured at least expense by selecting ground that is already well seeded, then cutting an overtopping tree here or increasing the shade there, and, above all, by carefully guarding against fire.

(13) A good protection against fire may be formed by clearing and cultivating under crops of Potatoes, Beans or Corn, a strip at least four rods wide around the tract. Wagon-roads also form a good protection, while even trails sometimes check the progress of a fire, and are useful to make the forest accessible to watchmen.

(14) Conditions found in one forest are not necessarily found also in another; and principles that may apply in Minnesota may not apply in New York or Pennsylvania, so one cannot understand one region exactly by studying another. For example, much of the White Pine of Carlton County grows under very different circumstances from that of Crow Wing County, and so each tract under consideration needs to be examined; the whole ground needs to be studied, carefully mapped and described before a definite method of treatment can be devised.

It may be well to recapitulate and make more plain the natural course of development which I think the notes indicate.

Note 5 briefly describes the condition under which the best White Pine-timber is found, and the following notes are intended to trace the tree back through its most prominent stages of development to the tiny seedling, and even to show under what conditions the seeds have been sown. To reverse this order and begin with the parent trees left alive after a disastrous fire: The first White Pine-seeds that fall on the bare ground are not successful, but after a few years, when a protecting coppice of Poplars, etc., has developed, the Pine may start under it.

By a more vigorous upward growth the coppice is soon overtopped, and then serves the Pine as a nurse, subduing lateral branches, promoting upward growth, protecting against shaking and evaporation by wind, preserving the snows of winter until late in spring; by deposits of leaves keeping frost out of the ground, and thus permitting the percolation of water during the winter; mulching the soil and furnishing constant nutriment not only by the decay of leaves and twigs, but more, perhaps, by the fertilization through worms, insects and other small animals.

The Pines outlive several generations of nurses, some of which are valuable in themselves, and may be utilized with profit by cutting before the Pine is cut. The inference may be

rightly drawn that timber can be grown at least expense by selecting tracts now under favorable conditions, and merely aiding nature, and avoiding the great expense of much planting, with continued cultivation and pruning.

Carlton, Minn. *H. B. Ayres.*

The Columbian Exposition.

The Plant-effects in the Horticultural Building.

THE great Horticultural Building comprises a dome area from which extend, in each direction, two parallel curtains or wings, which connect the dome with two end pavilions. Between the curtains, on either side of the dome, is a court, one of which is devoted to the California Orange-orchard, already mentioned in this correspondence (page 309), and the other to the German Wine Building (page 329) and Lily-tanks. The dome and the two front wings or curtains are devoted to ornamental plants, while the rear wings are devoted to fruit displays. The dome is 187 feet in diameter, and has an inside altitude of 113 feet, while each of the curtains is 270 by 69 feet in floor area. The sides and roofs of these curtains are of glass. In fact, these wings are simply gigantic greenhouses of sufficient height to accommodate tall Palms and Bamboos. The floor is covered with cinders. This proves to be a very poor material for the purpose, being dirty and unpleasant to walk upon; its dull color is also objectionable among plants. In these great greenhouses many thousand plants are arranged in various fashions, a great number are in pots and some are bedded out.

There are sixteen distinct exhibits by different firms and individuals, but many of the displays are collective. The accompanying diagram shows the floor-plan of the dome and floricultural curtains at this time, the shaded portions representing the beds of plants.

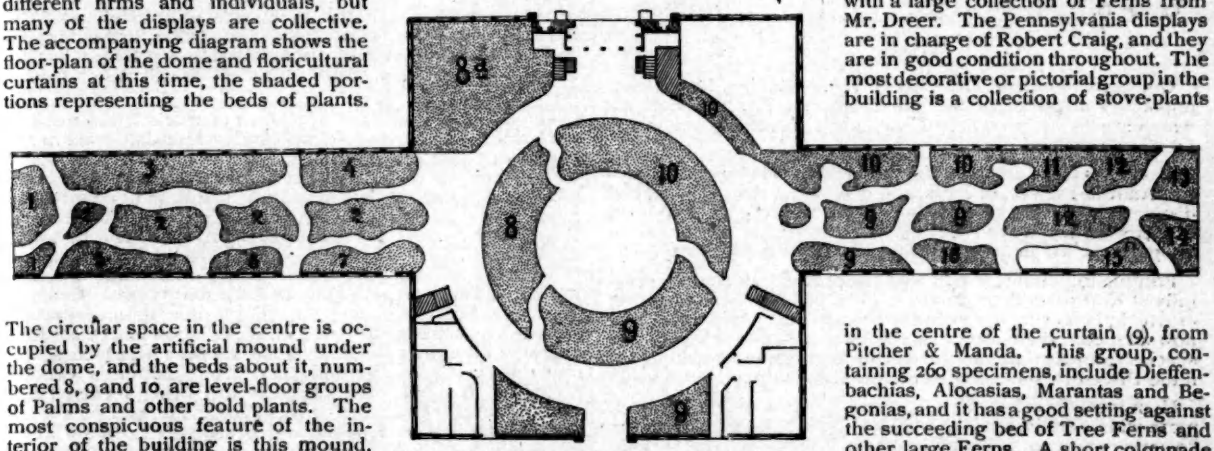

Fig. 54.—Ground-plan showing the arrangement of plants in the Horticultural Building at the Columbian Exposition.

The circular space in the centre is occupied by the artificial mound under the dome, and the beds about it, numbered 8, 9 and 10, are level-floor groups of Palms and other bold plants. The most conspicuous feature of the interior of the building is this mound, and the effect of the plants massed upon its flanks and summit at once arrests attention. The framework of the elevation, which was designed to represent a mountain, is a rough board scaffolding, beneath which is a crystal cave belonging to a private person, and to this an admission fee is charged. The cave itself is sufficiently out of place in a horticultural building, and the exterior of it, painted red, is but scantily covered by the unhappy plants which are perched upon it. The elevation in no way suggests a mountain and cannot fail to leave an unpleasant impression upon the mind of the visitor. There has been some attempt to construct rocks at intervals on this structure, of painted canvas and other material, but the observer is never deceived as to their character. This pile rises to the height of seventy feet, and the different steps and platforms are occupied by a heterogeneous mixture of plants, among which are boxes of Cannas, a good variety of Palms, and a crown of Ficuses. In order to cover the bare walls, evergreens were cut and adjusted to the vacant spaces, and some of these, dead and brown, are still in place in midsummer. The structure is full of ugly gaps, many of the plants are dry and sere, and the whole object is a most unhappy and crest-fallen spectacle. But, wholly aside from the poor condition of the decoration, its design is without purpose and is bad; it accomplishes nothing more than a rude filling of the space; it represents no mountain vegetation, nor the flora of any land, nor has it any artistic value. The base of this structure is greatly relieved by excellent collections of Palms, but these are beginning to look yellow and sickly, probably from the too intense light of the unscreened glass and the great height of the roof.

The group on the north of the dome, marked 8 in the plan, is contributed by the state of New York, in which important exhibitors are the Jay Gould estate, Julius Roehrs and Prospect Park. The collection is under the charge of James Dean, of Bay Ridge. Perhaps the most conspicuous plants in the group, which contains many fine specimens, are Ravenala Madagascariensis or Traveler's Tree, Seaforthia elegans, Pandanus utilis, Areca lutescens and Arenga Bonnettii, from the estate of Jay Gould; Dracæna Knerkiana, from Mrs. E. Beck, and good specimens of Thrinax elegans, Corypha australis, Pritchardia macrocarpa, Phœnix Canariensis and P. spinosa; also an abundance of Sweet Bay (8a). As these plants occupy the north side of the dome, they have been spared the ill effects of the unscreened glass, and are mostly in good condition. Pitcher & Manda's collection of Palms on the west side (9) is excellent in itself, and comprises some rare and costly species, but it has suffered considerably. Palms in this group worthy of special mention are a Kentia Forsteriana, twenty-five feet high, and carrying sixteen good leaves; Pritchardia Pacifica, and a variegated Latania Borbonica. About 150 varieties of Palms were originally placed in this collection. The remaining portion of the dome circle is occupied by Pennsylvania with various Palms of merit, many of which lack good labels.

The south wing contains many plants and groups of great merit, and most of the arrangement is good. Pennsylvania shows a long border (10, 10, 10), which begins with an admirable collection of variegated Caladiums opposite the dome, from George W. Childs, continues through a variety of plants contributed by Robert Craig, Henry A. Dreer and others, and ends on the south with a large collection of Ferns from Mr. Dreer. The Pennsylvania displays are in charge of Robert Craig, and they are in good condition throughout. The most decorative or pictorial group in the building is a collection of stove-plants in the centre of the curtain (9), from Pitcher & Manda. This group, containing 260 specimens, include Dieffenbachias, Alocasias, Marantas and Begonias, and it has a good setting against the succeeding bed of Tree Ferns and other large Ferns. A short colonnade of Tree Ferns, the tallest twenty-seven feet in height, comprises the centre of the group, with something over one hundred varieties making up the details. Opposite the low group of stove-plants is a general collection of Orchids, Anthuriums, Nepenthes and other plants of this class (9), from Pitcher & Manda. The Orchid display of this firm is the only one of importance in the building, and includes forty-seven kinds of Cypripediums, 403 plants of Cattleya Mossiæ, 390 of Cattleya citrina and thirty-four of the new Cattleya Gravesiana. Something over a thousand plants of Orchids have been shown in this collection.

Following Pitcher & Manda on the south is the most extensive and best collection of Begonias with decorative foliage (16), shown by E. G. Hill & Co. A large collection of Cacti is shown beyond this by Mrs. Anna B. Nickels, of Laredo, Texas. The extremity of the curtain is occupied by a general collection of Palms, stove-plants, Gardenias and others, shown by Massachusetts (11), Missouri (12, 12), J. C. Vaughan (13), Albert Fuchs, Chicago (14), and Texas or Galveston (15). Opposite the dome, on the west (9), is a large collection of Cycads from Pitcher & Manda, including about thirty varieties. The south curtain presents a certain continuity and progression of effect which is pleasing, especially when seen from the gallery of the dome. It rises gradually from the low group of stove-plants in the foreground to the taller Ferns and Palms in the rear, and the bright-colored foliage and flowers give it an air of finish which is charming.

The north curtain is much more heterogeneous in its effects. It contains, however, a wonderful collection of plants, especially

in the great Tree Ferns and giant Stag-horn Ferns from New South Wales (2, 2, 2, 2), which extend, like a forest, down the middle of the building, and the curious dwarfed trees of the Japanese garden (3). The foreground of this curtain is flanked by a tasteful group of Palms and other tropical plants sent by Ontario (4) and under the charge of Mr. Gilchrist. At the extreme end (1, 1) Trinidad interposes a bold group of Palms and Bamboos. Roses and Azaleas are shown on the west side by Germany (5) and Belgium (6); and Mexico balances Ontario with a very remarkable collection of Cacti (7). As seen from the north gallery of the dome, this wing produces a most gaudy and bewildering effect because of the individuality of the groups and the profuse use of banners and pendants by the New South Wales exhibit. The Japanese garden is the unique feature in the curtains and is worth a detailed description.

Although there are some details in these plant curtains which seem to jar with the spirit of the design—especially the booths and sales-stands—the general effect is good, especially when it is considered how hastily the collections were procured and the many difficulties which are met with in carrying out so great an enterprise. It is to be regretted that there are not more individual growers and firms concerned in the exhibits, and that the educational features have often been overshadowed by attempts at mere decoration. The dome-piece is the feature open to most serious criticism, and this is altogether bad. It is but just to say that the dome is too immense to allow of wholly satisfactory treatment at a temporary exhibition, and the fault lies in trying to fill it. The side-curtains, on the other hand, are of such shape that they give a long perspective and readily lend themselves to good effects.

Chicago, Ill. *L. H. Bailey.*

Notes.

Our correspondent, Mr. Charles H. Shinn, has lately been appointed inspector of the two California Forestry Stations which are to be reorganized under his direction and which promise increased usefulness.

Monsieur H. L. de Vilmorin, the head of the house of Vilmorin, Andrieux & Co., of Paris, and one of the most learned and distinguished horticulturists in Europe, has recently arrived in this city on his way to Chicago to attend the Horticultural Congress, at which he is to read a paper upon seed-raising.

Primula imperialis, which was raised and flowered successfully at Kew several years ago, ripened plenty of seeds, not one of which, however, has germinated, and the old plants have now all died. If any one who obtained plants or seeds of this species from Kew has succeeded in keeping and multiplying it the Director would be glad to hear from him.

Hymenocallis calathinum, by no means new, would be much more widely cultivated if its value as an out-of-doors summer flowering plant were better known. The bulbs can be kept over winter as easily as those of the Gladiolus. In midsummer the display of its clear white Eucharis-like flowers on their tall scapes is unusually handsome. They are specially useful as cut flowers in large vases.

Cypripedium Nicholsonianum has been recently sold by the Messrs. Sander & Co. as a distinct Cypripedium, from the little-known island of Palawan. In habit it is somewhat intermediate between C. Rothschildianum and C. Sanderianum, but quite distinct in its blunt-pointed leaves, which are of a clear shining green with gray tessellations. The plants are sturdy, and apparently free both in growth and flower. Mr. Watson writes that it will not be surprising if when they flower they prove to be identical with the beautiful C. Rothschildianum, or a variety of it.

In the Japanese section in the Forestry Building at Chicago there is a beautiful exhibit of starch made from the roots of the Pueraria Thunbergiana, which seems to be an article of common use throughout Japan. The stems of the vine are used for binding firewood, and its leaves as food for animals. P. Thunbergiana, described in Garden and Forest, vol. v., p. 574, has been largely distributed in this country as Dolichos Japonicus. It is a rampant grower, and, although it rarely flowers in the northern part of New England, is useful wherever a vine is needed to cover a trellis rapidly.

Among the species of Gladiolus, seekers after quaint and curious flowers will find many interesting plants, some of which are also very handsome. Gladiolus sulphureus, now in flower, is one of the most striking of these. The spike is closely set, with moderate-size flowers of a pale sulphur-yellow, which are tinged with green on first opening. This is a species from Mount Kilimanjaro, where it was found at a height of 5,000 feet, and it does not seem to be much in cultivation. The G. sulphureus usually offered by the florists is a variety of G. tristis, a South African species and not nearly so deeply colored, though a good cool-house plant to flower with Cape bulbs in the early spring.

The *Gardeners' Chronicle*, in a recent issue, comments, in the following words, upon the academic honors lately conferred by Harvard and Yale upon Frederick Law Olmsted and Horatio Hollis Hunnewell: "Academic recognition of this character is of far higher value in such cases and much more appropriate than are the titles given by the state to politicians as a reward for party services, or to men of business merely because they have been successful in amassing wealth. The two American Universities have followed the lead of their older sisters in England, and it is not long since Trinity College, Dublin, conferred the honorary degree of M. A. on a distinguished gardener, Mr. Burbidge, the author of one of the most useful books in the gardeners' library, *Cultivated Plants, their Propagation and Improvement.*"

In the year 1886 a society was organized in Holland to make plans for the draining of the Zuyder Zee. It now officially reports that three-fourths of the soil covered by these 900,000 acres of water is as fertile as surrounding districts, and proposes a scheme of drainage which will leave 300,000 acres in the centre as a lake, while the rest will be redeemed at a rate that will annually render from 12,000 to 15,000 acres habitable. The cost of the entire work is estimated at $76,000,000. The largest enterprise of the same sort hitherto carried out has been the draining of the Haarlem Lake, which, after thirty-nine months of labor, added 46,000 acres to the solid soil of Holland. When the Zuyder Zee was formed by an inundation, in the thirteenth century, some 80,000 lives are believed to have been lost, and this fact gives an idea of the profit which will result from its redemption.

The only new fruit of importance in market this week are nectarines, which have been coming from California in such abundance that they are found on the sidewalk fruit-stands, where they sell for twenty cents a dozen. The nectarines which have thus far arrived are small, and do not approach in quality the fruit grown under glass. Crawford and Mountain Rose peaches have been coming in from Delaware for ten days past. The best of these peaches sell for two dollars and fifty cents a basket, a fair quality being offered for a dollar a basket, and an inferior quality as low as fifty cents. California peaches continue to arrive, as also California plums and prunes, among which are the Columbian, Washington and Quackenbos gages and the Gros prune, five-pound boxes of which sell for one dollar. Choice Bartlett pears from California continue plentiful. A supply of this fruit is also being received from the Hudson River section of New York state, and sells at one dollar and a half to a dollar and seventy-five cents a keg at wholesale, the California fruit bringing a dollar and twenty-five cents for the same quantity. Muscat Alexander and Hamburg grapes, from Newport hot-houses, are a dollar and twenty-five cents a pound.

At the late Convention of Florists in St. Louis, Mr. Patrick O'Mara read a paper on the saving of labor in floriculture. One device to facilitate watering has proved most successful this year, when, on account of the very dry weather, it has been necessary to water outside grounds almost constantly. Mr. O'Mara said: "We use city water, metered to us, and have our grounds piped with hydrants at convenient distances throughout. Instead of having a man to hold the hose and distribute the water, we have pieces of hose connected with a 'Y.' These are inserted at the end of every twenty-five feet of hose, one arm of the 'Y' serving to connect the lengths, while to the other arm is fastened a 'Water Witch' lawn-sprinkler. We use one-inch hose and have force of water sufficient to operate five of these sprinklers on one stretch of hose, so that we can water a surface of 125 feet by twenty-five, without any labor but the stretching of the hose and turning on the water. Two hours is found sufficient to water one spot, and then the hose is moved. In our 100-foot houses, when first erected, a hydrant was placed at one end, but some years ago we changed the system and now have the hydrants in the centre of the houses, one on each side of the middle bench. In our 300-foot houses we have the hydrants at intervals of fifty feet, so that the whole place out-of-doors and under glass is supplied with conveniently located hydrants. The amount of labor saved in one year by this method more than paid the entire expense of the alteration, besides the great saving in hose, which in itself is a considerable item."